Technology Challenges and Solutions for People with Disabilities: The National Security Agency (NSA) Experience

Rehabilitation and Assistive Technology Society of North America
2010 Annual Conference
Red Rock Resort – Las Vegas, Nevada
June 29, 2010
Presentation Outline

- Introductions and Overview of NSA
- The Office of Disability Affairs at NSA
- Presentation of Current Cases and Solutions
- Work in Progress – Unresolved Challenges
- Discussion Period
NSA Vision and Mission

- Information Superiority for America and Its Allies
- To Provide and Protect Vital Information for the Nation
At the beginning of the 1990’s there was a strong desire to create a Disability Technology Center to serve employees with disabilities in the National Security Agency.
Environmental Factors

The Setting

- Passage of the Americans with Disabilities Act of 1990
- A rapidly increasing pace of available computer and technological assistive devices
- Failure to meet Federal Affirmative Action goals for employees with disabilities
- A growing number of cases referred by employees and supervisors wanting to keep employees who develop disabilities AND maintain their level of pre-disability productivity
Just Do It
The Ingredients

- No corporate commitment
- No sponsorship
- No leader
- No space
- No people
- No money

- Business case presented to Director, NSA
- Director, EEO
- Director, CCAT
- Took what was available
- Start small (2-3 people)
- Start small ($60k-$100k)
  - Maximize use of Department of Defense Computer/Electronics Accommodation Program
Ensuring Survival
Bureaucratizing the Solution

• Every new Director, EEOD affirms support as a top priority (inclusion in Strategic Plan for EEOD operations) and obtains support from the Director, NSA
• The current Chief, Office of Disability Affairs has been in place for 15 years
• Moved from available space to permanent, optimal space through planning
• Right skill mix – Government/Contractor mix. Corporate commitment to staff
• A formal funded program, with a program manager was created and incorporated into NSA’s 5 year budget cycle: a steady $500K+ annual budget plus manpower
The National Security Agency has over 18 years experience behind its state-of-the-art Office of Disability Affairs Technology Center for employees with disabilities, which has a very promising future for continued service to NSA’s most important national security asset – our people.
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The Office of Disability Affairs

Ms. Pattie Dahlen
Chief
Office Overview

• Chief
• Deputy Chief
• ADA Facility Project Manager
• Ergonomic Specialist/ RA Case Worker
• RA Case Worker
• 4 Sign Language Interpreters
• Deaf/Hard-of-Hearing Engineer
• 2 System Engineers
• Retired Annuitant – Sign Language Interpreter
Responsibilities

- Facilitate the reasonable accommodation process
  - Conduct needs assessments and provide solutions
  - Ensure Facility Accessibility
- Education of the Work Force
  - Sign Language Classes
  - Gaining Offices
  - Leadership
- Section 508 (to include web and software development)
Responsibilities (con’t)

• Disability-Related Policy
• Consultation with Agency partners
• Counseling employees/supervisors on difficult or sensitive issues
• Research, test and evaluate new Assistive Technologies
Responsibilities (con’t)

- Evaluate websites and on-line courses for accessibility/usability
- Assist the Office of Recruitment at various colleges, disability career fairs and hiring events
- Participate in Operation War Fighter
- Conduct Tours/Demonstrations
Office of Disability Affairs

LAB

• Provides:
  • Opportunity for employees to see a variety of equipment that satisfies agency requirements and are “options” for accommodations
  • Testing, research and development to integrate new/updated technology into the agency
  • Workforce re-entry for employees after long-term absence
  • Hands-on demonstrations to managers, supervisors, offices, and VIP’s
  • Ergonomic Assessments and Assistive Technology for Workstation Considerations
  • Centralized communications center for overflow events (video streams into classes, meetings, etc.)
Office of Disability Affairs LAB (con’t)

Provides:

- Resource information on community, state, national resource information
- Contacts within the DoD, IC and overall federal government
- Recruitment guidance on how to interact with individuals with variety of disabilities seeking employment
- Knowledge, skills and expertise in creating Agency accepted policies, procedures and practices for Agency compliance as it increases the number of individuals with disabilities in the workplace
- Counseling to employees, managers, supervisors, co-workers, trainers, etc.
- Consultation to external requests as the Model for the Federal Government
Office of Disability Affairs

LAB (con’t)

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Seeing is believing

(Aumed)

LCD screen. Eye-Q has three different display modes available:

1. True color mode
2. Black-White positive mode
3. White-Black negative mode

When Eye-Q LCD is first turned on, it displays the image in true color. Press the (2) button you will cycle through these 3 options.

Button: Freeze Mode Button. Press the (5) button you can pause and capture the current image to get a freeze frame. Press the (5) again Eye-Q will go back to ready mode. When the image is frozen, the light will turn off automatically to save energy.
Office of Disability Affairs LAB (con’t)
Office of Disability Affairs LAB (cont)
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Office of Disability Affairs

LAB (con’t)
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LAB (con’t)
Office of Disability Affairs
LAB (con’t)
Limitations

- Security
- Wireless
- Compatibility with current Agency infrastructure
- Timeliness (request to expectation of receipt)
- Agency Process Practices that we must follow
Unique Solutions

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Evolving Solutions to Blind User Accessibility of Corporate Business Applications

Mr. Joe Cummings
Systems Engineer
Overview - Evolving Solutions

- Accessibility in the evolution/migration of Analyst Applications: from unix to windows, to web, X11/Motif, java/swing to SWT (Standard Widget Toolkit)/Jface to “Web 2.0”

Three main issues to accessibility
- Access to Client Workstation (screen reader)
- Application compatible with screen reader
- Accessible Content Type (i.e. pdf, text/html)

Note: Audience assumed to have some familiarity with software development terms
PAST 80's-90s

• Unix desktops with X11/Motif application environment

• **Problem:** no screen reader for application environment, inaccessible widgets

• **Solution:** command line interface and emacs with emacspeak

• **Limitation(s):** no universal design & limited to textual representation
PRESENT 90s-2000s

• Mix of unix & windows desktops using java/swing for analyst applications

  **Problem:** java/swing widgets not initially supported on windows desktop nor did screen readers support java/swing

  **Solution:** Access Bridge + Accessibility API + partnership with screen reader vendor to support java/swing

• **Limitation(s):** Three legged stool approach

• demo
Java/Swing Demo

This example shows the use of a JTable. The accessible names for the tables were set manually using the setAccessibleName() method. The first table is a simple JTable. The second table is more complicated - other Java components (other than just plain text) are contained within the table cells.
Largely Windows desktop moving to Eclipse based, SWT, Jface apps

**Problem:** Not all SWT/Jface component mappings to native widgets were accessible

**Solution:** Select widgets carefully, work with sources to improve accessibility (in-progress)

**Limitations:** No “three legged stool,” but technology still has some “bugs” or architectural issues

**demo**
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SWT/Jface Demo

<table>
<thead>
<tr>
<th>Plains Animal</th>
<th>Solitary Horned Animal</th>
</tr>
</thead>
<tbody>
<tr>
<td>tatanka =&gt; Item 0.1</td>
<td>kifaru =&gt; Item 0.1</td>
</tr>
<tr>
<td>tatanka =&gt; Item 0.2</td>
<td>kifaru =&gt; Item 0.2</td>
</tr>
<tr>
<td>tatanka =&gt; Item 0.3</td>
<td>kifaru =&gt; Item 0.3</td>
</tr>
<tr>
<td>tatanka =&gt; Item 0.4</td>
<td>kifaru =&gt; Item 0.4</td>
</tr>
<tr>
<td>tatanka =&gt; Item 0.5</td>
<td>kifaru =&gt; Item 0.5</td>
</tr>
<tr>
<td>tatanka =&gt; Item 0.6</td>
<td>kifaru =&gt; Item 0.6</td>
</tr>
<tr>
<td>tatanka =&gt; Item 0.7</td>
<td>kifaru =&gt; Item 0.7</td>
</tr>
<tr>
<td>tatanka =&gt; Item 0.8</td>
<td>kifaru =&gt; Item 0.8</td>
</tr>
<tr>
<td>tatanka =&gt; Item 0.9</td>
<td>kifaru =&gt; Item 0.9</td>
</tr>
</tbody>
</table>

Remove column
FUTURE late 2010 – Beyond...

- “Web 2.0,” extjs, etc.
- **Problem:** New “Web 2.0” technologies don’t always implement WAI-ARIA or proper accessibility support
- **Solution:** Work w/technology providers to implement WAI-ARIA support (in-progress)
- **Limitations:** Small business, limited resources
- demo
Future Dilemmas

- Thin clients
- New desktop widgets
- New ‘Web N” widgets
- New devices, i.e. readers
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Resources

• Java/Swing - http://java.sun.com/javase/
• Java Accessibility API & Access Bridge-
  http://java.sun.com/javase/technologies/accessibility/index.jsp
• Eclipse - http://eclipse.org/
• SWT/JFace - http://www.eclipse.org/swt/,
  http://wiki.eclipse.org/index.php/JFace
• Swing Demo - http://securetechnologies.com/CCAT/SwingDemo/
• TreeViewer problem - Eclipse Bug # 73485 - http://www.eclipse.org/newsportal/article.php?id=44261&group=eclipse.platform.swt#44261
• WAI-ARIA: http://www.w3.org/WAI/intro/aria
Definitions

- X11: a computer software system and network protocol that provides a graphical user interface (GUI) for networked computers
- Motif (widget toolkit): A graphical user interface toolkit used in software development
- Java Swing: A widget toolkit for java
- SWT: a graphical widget toolkit for use with the Java platform
Definitions (con’t.)

• Jface: A **UI toolkit** that provides helper **classes** for developing UI features that can be tedious to implement.

• WAI-ARIA: WAI-ARIA, the Accessible Rich Internet Applications Suite, defines a way to make Web content and Web applications more accessible to people with disabilities.

• Emacs – A feature-rich, extensible text editor.

• Emacspeak – A free screen reader for emacs
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Case Study Situations
Technology Challenges and Solutions for People with Disabilities: The National Security Agency (NSA) Experience
Thank you

• Contact Information:
  • Dr. Len Reinsfelder – 410-854-6334
    ltreins@nsa.gov.
  • Mrs. Patricia Dahlen – 301-688-7779
    padahle@nsa.gov.
  • Mr. Joe Cummings – 301-688-7779
    jmcummi@nsa.gov.

• Website: www.nsa.gov.